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Hertfordshire AL4 8AN, UK
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Evaluation of the efficacy of a non-penetrating captive bolt to euthanase neonatal goats up to 48 hours of age

MA Sutherland*[†], TJ Watson[†], CB Johnson[‡] and ST Millman[§]

[†] AgResearch, Ruakura Research Centre, Hamilton 3240, New Zealand

[‡] Institute of Veterinary, Animal and Biomedical Sciences, Massey University, Palmerston North 4442, New Zealand

[§] Department of Veterinary Diagnostic & Production Animal Medicine, Iowa State University, IA 50111, USA

* Contact for correspondence and requests for reprints: mhairi.sutherland@agresearch.co.nz

Abstract

*Manual blunt force trauma is a common method of euthanasia or culling of goat kids, however it is difficult to apply consistently and may vary in effectiveness. Therefore, a controlled mechanical method is needed. The overall objective of this research was to evaluate the effectiveness of a non-penetrating captive bolt (NPCB) to euthanase goats (*Capra hircus*) up to 48 h of age. In a pilot study (n = 27), the optimum anatomical site for placement of the NPCB was evaluated using signs of insensibility and death, and post mortem assessment of traumatic brain injury. Three different anatomical sites (frontal bone, poll or behind the poll) were evaluated. In Experiment 1 (n = 100), goats were euthanased using the optimum anatomical placement determined in the pilot study and the presence of brainstem reflexes, rhythmic respiration, convulsions and cardiac activity were recorded. In Experiment 2 (n = 7), electroencephalogram (EEG) was recorded to assess awareness following application of the NPCB. Results from the pilot study showed that immediate insensibility followed by death was achieved when the muzzle of the NPCB was positioned behind the poll and the goat's head was bent so that the chin touched the chest. In Experiment 1, all goats were rendered immediately insensible without return to sensibility prior to cessation of cardiac activity. In Experiment 2, application of the NPCB resulted in the immediate onset of EEG activity which was incompatible with awareness. In conclusion, the NPCB reliably caused immediate insensibility and death in goats up to 48 h of age.*

Keywords: animal welfare, electroencephalogram, euthanasia, goats, insensibility, non-penetrating captive bolt